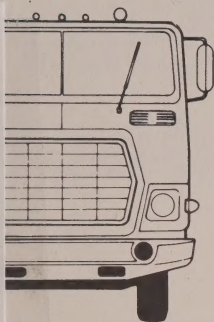


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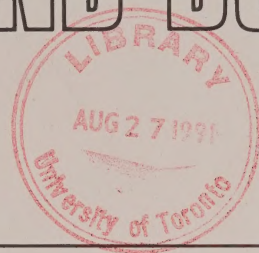
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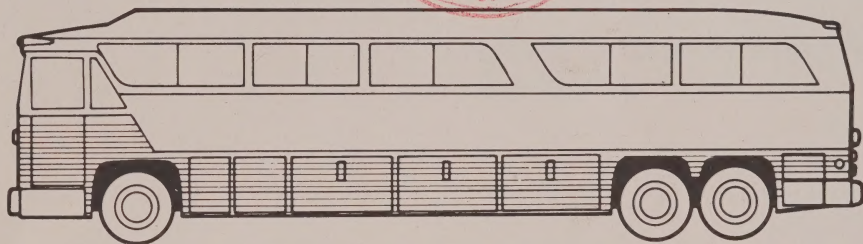
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TRUCK AND BUS DRIVER'S

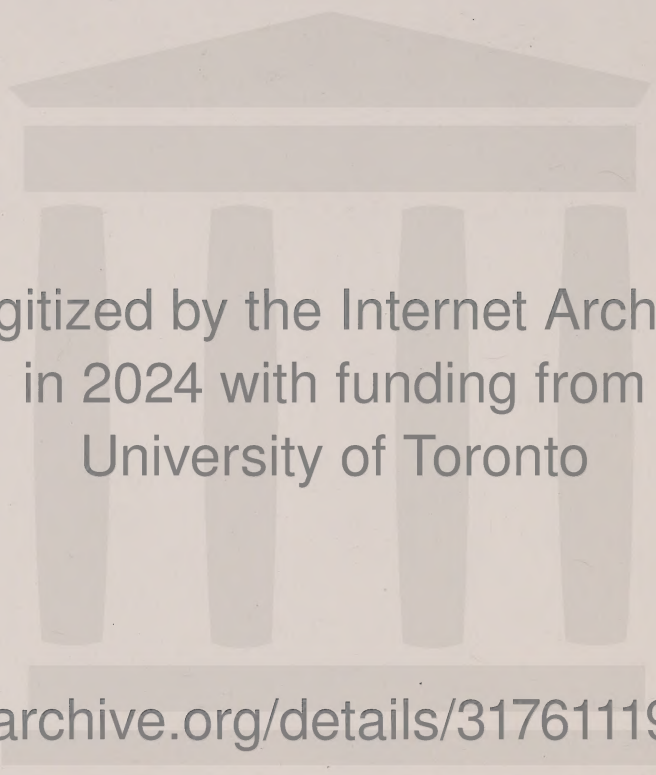


MANUAL



Ontario

Ministry of
Transportation



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Truck and Bus Drivers Manual

**Driving is a privilege—
not a right**

This booklet is only a guide

For official purposes, please refer to
The Highway Traffic Act of Ontario

Prepared and issued without charge by the Ministry of
Transportation, Ontario

Disponible en français.

Demandez le "Guide du chauffeur de camion et d'autobus".

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recycled paper

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INTRODUCTION

This manual supplements the basic driving information contained in the Driver's Handbook. It has been prepared to assist applicants wishing to qualify for a class A, C, D or F driver's licence, by providing the information required to meet the standards for these classes and setting out the various skill tests they will be expected to perform during a driving test.

Obtaining such a licence requires, in addition to the basic knowledge of the rules of the road, a knowledge of the laws which govern the operation of trucks and buses, and an understanding of the special skills needed.

Drivers of large motor vehicles are not only expected to have the necessary operating skills, but be able to demonstrate the safe driving practices, applicable to such vehicles.

LEGISLATION

The following Acts and regulations made thereunder each govern certain aspects of the movement of both passengers and property:

1. The Highway Traffic Act (H.T.A.) and regulations govern the driver, the vehicle and equipment, weight and size of loads, etc.
2. The Public Commercial Vehicles Act (P.C.V.) and regulations control the movement of goods on the highways by truck.
3. The Public Vehicles Act (P.V.A.) and regulations control the movement of people on the highways by bus.

It is not the intention of this booklet to discuss or explain these various Acts and regulations, merely to provide an applicant with the basic knowledge required of drivers of such vehicles.

Definitions

The following definitions are taken from the relevant statutes outlined above:

Ambulance Service: means ambulance service within the meaning of **The Ambulance Act**.

Bus: means a motor vehicle designed for carrying 10 or more passengers and used for the transportation of persons.

Commercial Motor Vehicle: means any motor vehicle having permanently attached thereto a truck or delivery body and includes ambulances, hearses, casket wagons, fire apparatus, buses and tractors used for hauling purposes on the highways.

Gross Weight: means the combined weight of vehicle and load.

Registered Gross Weight: means the weight for which a permit has been issued under the H.T.A., the fee for which permit is based upon the weight of the vehicle or combination of vehicles and load.

Ministry: means the Ministry of Transportation.

Motor vehicle: includes an automobile, motorcycle, motor-assisted bicycle unless otherwise indicated in The H.T.A., and any other vehicle propelled or driven otherwise than by muscular power, but does not include the cars of electric or steam railways, or other motor vehicles running only upon rails, or a motorized snow vehicle, traction engine, farm tractor, self-propelled implement of husbandry or road-building machine within the meaning of The H.T.A.

School Bus: a chrome yellow bus that is used for the transportation of,

- (i) children to or from school or church, or
- (ii) mentally retarded adults to or from a training centre,

that bears on the front and rear thereof the words "school bus" and on the rear thereof the words "do not pass when signals flashing".

School Purposes Bus: a bus while being operated by or under contract with a school board or other authority in charge of a school for the transportation of children, or a chrome yellow school bus operated for the transportation of children to or from church or mentally retarded adults to or from a training centre.

Semi-Trailer: means a trailer designed to be operated with the forward part of its body or chassis resting upon the body or chassis of a towing vehicle.

Trailer: means a vehicle that is at any time drawn upon a highway by a motor vehicle, except an implement of husbandry, a mobile home, another motor vehicle or any device or apparatus not designed to transport persons or property, temporarily drawn, propelled or moved upon such highway, and except a side car attached to a motorcycle and shall

be considered a separate vehicle and not part of the motor vehicle by which it is drawn.

Vehicle: includes a motor vehicle, trailer, traction engine, farm tractor, road building machine and any vehicle drawn, propelled or driven by any kind of power, including muscular power, but does not include a motorized snow vehicle or the cars of electric or steam railways running only upon rails.

PROBATIONARY DRIVERS

A probationary driver may hold a class A, C, D, F, G, M, L or R driver's licence, or combination, but may not hold a school bus driver's licence, (class B or E) or a driving instructor's licence.

See Driver's Handbook for further details.

DRIVER'S LICENCE CLASSES AND REQUIREMENTS

5

Driving competence is assessed during a road test with a Ministry examiner, an authorized employer, a Community College or private schools. An authorized employer or Community College known as Recognized Authorities may issue a certificate of driving competence for classes A, B, C, D, E, F and M.

CLASS A is authority for the operation of:

a motor vehicle and towed vehicles where the towed vehicles exceed a total gross weight of 4600 kg (10,000 lbs.), or the operation of vehicles included in classes "D" and "G", but not buses carrying passengers, nor motorcycles.

Minimum Requirements For Application: age 18, must hold a valid Ontario class "G" or higher licence or equivalent; pass a test of operating knowledge of large trucks and tractor trailers; meet vision standards, provide a satisfactory medical certificate on application and, periodically thereafter; demonstrate driving competence during a road test in a combination of a motor vehicle exceeding 11,000 kg (24,000 lbs.) gross

weight or registered gross weight and a towed vehicle exceeding 4600 kg (10,000 lbs.) total gross weight.

CLASS B is authority for the operation of:

any school purposes bus having a designed seating capacity for more than 24 passengers. It also allows you to operate vehicles included in Classes C,D,E,F, and G, but not a motorcycle.

Minimum Requirements For Application: age 21 must hold a valid Ontario Class "G" or higher driver's licence or equivalent; successfully complete a Driver Improvement Course approved by the Minister and pass a test of knowledge of the operation of a school purposes bus, buses and large trucks; meet vision standards and provide a satisfactory medical certificate on application and, periodically thereafter; demonstrate driving competence during a road test in a bus having a designed seating capacity for more than 24 passengers. Must not be of probationary status.

NOTE: See School Bus Manual for additional qualifications required by school purposes bus drivers.

ALL CLASSES OF DRIVER LICENCES AUTHORIZE THE OPERATION OF A
MOTOR-ASSISTED BICYCLE (MOPED) AND MOTORIZED SNOW VEHICLE.

CLASS C is authority for the operation of

any bus having a designed seating capacity for more than 24 passengers, **but not a school purposes bus* carrying passengers.** It also allows you to operate vehicles included in classes D,F and G, but not a motorcycle.

Minimum Requirements For Application: age 18, must hold a valid Ontario class "G" or higher driver's licence or equivalent, and pass a test of knowledge of the operation of buses and large trucks; meet vision standards and provide a satisfactory medical certificate on application and, periodically thereafter; demonstrate driving competence during a road test in a bus having a designed seating capacity for more than 24 passengers.

*See page 3 for definitions of a "school purposes bus".

CLASS D is authority for the operation of

any motor vehicle exceeding 10,909 kg (24,000 lbs.) gross weight or registered gross weight, and any combination of a motor vehicle exceeding a total gross weight or registered gross weight of 11,000 kg (24,000

lbs.), and towed vehicles not exceeding a total gross weight of 4600 kg (10,000 lbs.). It also allows you to operate vehicles included in class G, **but not a bus carrying passengers,** and not a motorcycle.

Minimum requirements For Application: age 18, must hold a valid Ontario Class "G" or higher driver's licence or equivalent, and pass a test of knowledge of the operation of trucks; meet vision standards and provide a satisfactory medical certificate on application and demonstrate driving competence during a road test in a motor vehicle exceeding 11,000 kg (24,000 lbs.) gross weight or registered gross weight.

CLASS E is authority for the operation of:

any school purposes bus having a designed seating capacity for not more than 24 passengers. It also allows you to operate vehicles included in classes F and G, but not a motorcycle.

Minimum Requirements For Application: age 21, must hold a valid Ontario class G or higher driver's licence or equivalent; successfully complete a driver

improvement course approved by the Minister and pass a test of operating knowledge of school purposes bus and buses; meet vision standards and provide a satisfactory medical certificate on application and periodically thereafter; demonstrate driving competence during a road test in a school purposes bus with a designed seating capacity for not more than 24 passengers. Must not be of probationary status.

NOTE: See School Bus Manual for additional qualifications required by school purposes bus drivers.

CLASS F is authority for the operation of:

any ambulance or any bus having a designed seating capacity for 10 or more passengers, **but not more than 24 passengers**, and **not a school purposes bus carrying passengers**.

It also allows you to operate vehicles included in class G, but not a motorcycle.

Minimum Requirements For Application: age 18, must hold a valid Ontario Class "G" or higher driver's licence or equivalent, and pass a test of operating

knowledge of buses; meet vision standards and provide a satisfactory medical certificate on application and, periodically thereafter; demonstrate driving competence during a road test in a bus with a designed seating capacity for not more than 24 passengers or an ambulance.

CLASS G is authority for the operation of:

any motor vehicle not exceeding 11,000 kg (24,000 lbs.) gross weight or registered gross weight. Also, you may drive any combination of a motor vehicle not exceeding a total gross weight or registered gross weight of 11,000 kg. (24,000 lbs.) and towed vehicles where the towed vehicles don't exceed a total gross weight of 4600 kg (10,000 lbs.). A class G licence **does not** allow you to drive:

- (a) a motorcycle,
- (b) a bus carrying passengers,
- (c) an ambulance in the course of providing ambulance service to the public.

Minimum Requirements: age 16, with parent's or guardian's signed consent, must pass a test of operating knowledge of small trucks, vans, or passenger cars, meet vision standards and demonstrate driving competence during a road test in a motor vehicle not exceeding 11,000 kg (24,000 lbs.) gross weight or registered gross weight.

CLASS L licence is a **learner's** licence, allowing you to drive any class G motor vehicle on a highway, providing the holder of a class A,B,C,D,E,F, or G driver's licence is occupying a seat beside you for the purpose of giving driving instructions.

Minimum Requirements: age 16, pass the basic preliminary test and vision screening.

CLASS R licence is a **learner's** licence, allowing you to drive a motorcycle for the purpose of training, subject to the following conditions:

- valid for one half hour before sunrise to one half hour after sunset,

- no passengers allowed,
- not valid for highways with speed limits in excess of 80 km/h (50 m.p.h.) except Hwys. 11 and 17.

Minimum Requirements: age 16, must pass the vision screening, basic preliminary written test, traffic recognition signs test and, a test on the operating knowledge relating to motorcycles.

CLASS M is authority for the operation of

a motorcycle. You may also drive any motor vehicle or combination of a motor vehicle and vehicles authorized under a Class G driver's licence, while the holder of a Class A,B,C,D,E,F, or G driver's licence occupies the seat beside you for the purpose of giving instructions.

Minimum Requirements: age 16, and be in possession of a valid class R driver's licence, and demonstrate driving competence during an off street skill test and a road test on a motorcycle.

LICENCE COMBINATIONS

There are several possible combinations. For example, class A and B can be obtained if the applicant has met the requirements for both. The licence designation in this case would be shown as AB.

Any class or combination of licence classes from G to A may be combined with Class M authorizing the operation of motorcycles if the applicant meets the requirements for class M. Additional authorization would be indicated by the combination of the licence class designation, i.e. AM, EM, ABM.

HIGHER CLASSES

When applying for a class A,B,C,D,E, or F licence, you must provide a completed satisfactory Ministry medical certificate. Blank medical forms can be obtained from any M.T.O. Driver Examination Office. A licence will be refused if the physical or medical condition of the applicant does not meet the standards outlined in the regulations of the H.T.A.

If your licence is conditional to wearing corrective lenses, do not drive without wearing them. Your medical practitioner or optometrist is required by law to report to the licensing authorities any physical, neurological, cardiovascular or other medical condition that might affect your safe operation of a motor vehicle.

Road Tests

Road tests consist of:

1. A pre-trip inspection commonly known as a Circle Check. (See pages 12 and 13). In each case, the applicant will name the item of equipment checked.
2. Class A applicants may be required to uncouple and couple the units of the combination vehicle, or be required to explain to the examiner the procedures.
3. The applicant will be required to drive in traffic and handle the vehicle safely.

Applicants applying for a higher class of licence are required to provide the proper type of vehicle for the test.

Applicants **should** study the operating manual for the vehicle to be used for the road test.

SIZE AND WEIGHT LIMITS FOR COMMERCIAL MOTOR VEHICLES

Commercial motor vehicles are restricted in width to a limit of 2.6 m (102 inches). Exceptions are made for specialized equipment such as traction engines, threshing machines, snow removal equipment, etc. Rearview mirrors are not included when determining the width of a vehicle.

Semi-trailers, other than those designed for transporting vehicles, are limited to a length of 14.65m.

Buses, other than articulated, are limited in length to 12.5 m

Any combination of vehicles is not permitted to exceed a length of 23m.

All vehicles including load are limited to a height of 4.15 m

No vehicle or combination of vehicles is permitted to be operated on a highway when the gross weight is in excess of the maximum weight permitted under Part VII of The H.T.A. and regulations.

TRUCK INSPECTION STATIONS

In Ontario, truck inspection stations are sited at various highway locations. Signs indicate whether or not the station is open. If open, trucks must enter and stop for inspection.

Vehicles and loads are checked for height, length, width and axle spacing. Registration permits and licences are checked to ensure that a "for hire" carrier has the authority to transport the goods carried within the terms of the licence.

Driver licences are also checked for validity and proper class.

Vehicles are subject to safety checks (brakes, lights, couplings, etc.)

In addition to permanent truck inspection stations, highly mobile units may be set up for varying lengths of time in any locality.

Any police officer or appointed Ministry officer can require drivers to drive to the nearest inspection station. If required, they must assist in the inspection of the vehicle.

Drivers who refuse or fail to proceed to a weigh scale, when required, are guilty of an offence and on conviction liable to a fine of \$200 to \$1,000. Drivers may also have their licences suspended for a period of not more than 30 days.

Also, drivers who refuse or fail to redistribute or remove part of the load, or make arrangements to do so, or obstruct any weighing, measuring or examination are guilty of an offence and on conviction liable to a fine of \$100 to \$200.

LOADING AND UNLOADING

The H.T.A. requires that any load overhanging the rear of a vehicle by 1.5 m (five feet) or more shall be marked by a red light when lights are required and, at all other times, by a red flag or marker.

All loads while being carried on a motor vehicle or trailer must be bound, covered or otherwise securely fastened or loaded so no portion of the load can fall off.

Before moving a load every driver should ascertain the type of cargo. Many commodities now being hauled require protective devices for the driver such as protective bulkheads, special lading, etc. Before starting a trip or after unloading, drivers should check that van doors are latched or that racks, tarps and other equipment are secured. (Reg. 428/81)

The driver is responsible to make sure the load is evenly balanced and properly secured against shifting. A cargo that breaks loose or shifts during a sudden

stop or sharp turn is a potential hazard that could cause an accident.

OPERATION OF COMMERCIAL MOTOR VEHICLES

The owner and the driver are responsible to ensure a vehicle is fit for highway use.

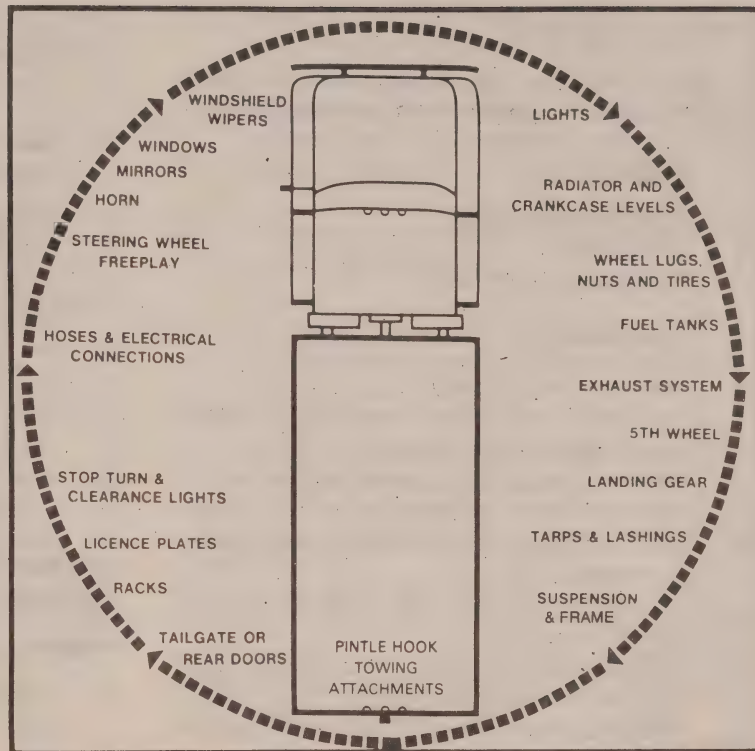
PRE-TRIP INSPECTION CLASSES A,C,D, AND F.

Before starting the day's work, drivers should inspect their vehicles and be capable of determining if their vehicles are in a safe operating condition. Inspection sheets assist in a systematic check procedure and ensure all components are inspected in a minimum of time. The circle check shown is the absolute minimum type of inspection that should be performed daily.

THE CIRCLE CHECK

This drawing shows a general method of making a systematic circle check before taking out a truck at the beginning of a day's work. Details of the check can, of course, be varied according to the type of vehicle, but generally the principle of making a complete circle should be followed.

Some points to look out for are given in the sample.



THE CIRCLE CHECK

As part of the road test, applicants will be asked to do the following, naming the function performed:

1. Engine, check:

- a. oil and coolant levels;
- b. all drive belts;
- c. for loose wires and leaks.

2. Enter cab and:

- a. adjust seat and mirrors;
- b. start engine (see 'Brake Inspection' for vehicles not equipped with air brakes);
- c. check all gauges, horn, wipers and ensure that the low air pressure warning device is operating;
- d. while air pressure is building up, check emergency equipment;
- e. charge trailer system, apply and release trailer brakes. (class A only);
- f. fan brakes until pressure drops, warning signal operates and compressor cuts in;
- g. when maximum pressure is regained, check for air leaks;

- h. apply brakes, checking for pressure drop (brake adjustment);
- i. turn on lights (low beam), put on left signal.

3. Leave cab and starting with left front, start circle clockwise, checking:

- a. all lights;
- b. wheel lugs, nuts and tires;
- c. air hoses and electric lines to trailer (class A only);
- d. tailgate, trailer doors or tarp tie-downs;
- e. trailer dolly wheels (class A only);
- f. fifth wheel (class A only);
- g. press dimmer switch, put on right signal;
- h. check signal lights and headlights;
- i. clean all glass and mirrors.
- j. suspension and frame.

UNCOUPLING AND COUPLING OF COMBINATIONS (CLASS A ONLY)

Uncoupling

- 1. Secure tractor and block trailer wheels if necessary; make certain trailer brakes are applied.

2. Check to see if ground is firm enough to support landing gear. If necessary use planks or pads.
3. Lower trailer landing gear, using low gear, if equipped, far enough to pick up weight of trailer to the proper height for uncoupling, and secure handle. Care must be exercised not to raise the trailer so high that no weight is on the fifth-wheel, or to avoid uncoupling with the trailer so low as to make re-coupling difficult or impossible. If the trailer has two-speed crank gear, place in low range and stow crank securely.
4. Release secondary lock, and pull the fifth wheel locking handle as far as it will go into open position.
5. Start the tractor and pull ahead until the trailer upper plate slips to the lower part of the fifth wheel just above the chassis of the tractor. Stop tractor in this position.
6. Close the air lines either by cocks at rear of tractor cab, or control valve on dash in cab.
7. Disconnect the emergency air line from the trailer emergency coupling; secure to the dummy coupler on the rear of the cab.
8. Disconnect light cord from socket on the trailer, hang on rear of cab.
9. Disconnect the service air line from the trailer service coupling, secure to dummy coupler on the rear of cab.
10. Re-enter tractor and pull ahead slowly until the two units are separated.

Coupling

Be sure the fifth-wheel jaws are fully opened and the fifth-wheel is tilted back so that hook-up can be made without damage. Make a visual inspection of the condition of the king-pin.

Back tractor so the fifth-wheel slot is in line with the trailer king-pin.

Stop tractor just as fifth-wheel makes contact with the trailer.

Before backing under trailer, check height of trailer in relation to height of fifth-wheel. Trailer should be at a height where moderate resistance is met as fifth-wheel contacts trailer plate.

Secure tractor and check to see the trailer is secured against movement **before** coupling.

If tractor is not equipped with trailer hand valve or emergency control valve, trailer wheels must be blocked.

Connect brake lines and light cord to trailer before coupling. Open cocks, if tractor is so equipped, or actuate control valve on dash in cab to charge trailer air system. Release trailer hand control valve and listen for exhausting air to determine if trailer

brakes are operating. Be sure trailer brake lines are properly connected.

REMEMBER! **RED** — is emergency
 BLUE — is service

These are the standard colours usually used in the trucking industry.

Back slowly under trailer. See that firm contact is made between the fifth-wheel and upper plate on trailer. Continue back until you hear the jaws lock.

Place tractor in forward gear and pull against trailer (if hand control valve is on tractor, use it to set trailer brakes for this check).

Check coupling: (Visual inspection)

- (1) Leave cab and look under front of trailer to be sure upper plate of trailer is resting firmly on fifth-wheel. If any space appears, coupling is not secure.

- (2) Be sure fifth-wheel release lever is in locked position and secondary lock, if equipped, is engaged.
- (3) From rear of tractor, see that jaws are completely closed.

Raise landing gear after checking hook-up before moving unit. Be sure gear is fully raised. If two-speed crank gear is used, place in low range, and stow crank securely.

DRIVING CLASSES, A,C,D, and F

Starting the Engine

1. Engage parking brake, adjust choke, depress clutch pedal, place transmission in neutral.
2. Turn on ignition, operate starter.

3. Control engine with foot throttle until it is running smoothly.
4. When running smoothly, set at fast idle and allow engine to warm up before attempting to move.
5. On air brake vehicles, air pressure gauge should register sufficient pressure before moving. Audible warning buzzer must have stopped sounding and/or warning light be off.

Putting Vehicle into Motion

On a combination, test hook-up by one of the following methods before attempting to get unit underway:

1. Place transmission in reverse, partially release the clutch and increase engine speed to move power unit backward in a short, sharp motion. This is known as "hitting the pin".

2. Depress clutch and place transmission in lowest forward gear. If vehicle is equipped with trailer hand control, pull it down to set trailer brakes to keep unit from rolling. If there is no hand control, set the trailer parking brake.

When starting to move, gradually release clutch and at the same time release hand control valve or parking brake. At the same time, engine must be speeded up gradually to prevent stalling.

Brakes must be checked immediately after the vehicle is underway, within at least 15 m (50 feet).

Transmissions

1. While it is the driver's responsibility to be thoroughly familiar with transmission shift patterns and shifting procedures, it is recommended that they study the applicable manufacturer's operating manual.
2. When starting to move, vehicles must be put in the lowest gear ratio available.

3. **Do not shock-load the drive-line through rapid operation of the clutch.** Extreme care should be taken when applying power to move heavy loads uphill.
4. Do not allow the clutch to slip, as excessive heat will be generated which will cause the clutch to drag and will bring on premature clutch failure. Remember: good co-ordination of clutch operation with transmission shifting will prolong the life of any vehicle.

Some vehicles are equipped with a **clutch brake**. When driving vehicles so equipped, the clutch pedal should not be depressed all the way to the floor when shifting...except when at a stop. To re-enter low gear, the pedal should be depressed to the floor for the clutch brake to stop rotation of main-shaft gears and produce an easy, quiet engagement into low gear, with the vehicle at rest.

Inter-Axle Differential Lock

The inter-axle differential lock is used on vehicles equipped with tandem rear axles. Differential lock is controlled by a lever or push-pull type control valve located on the instrument panel.

This feature can be in only two positions — lock **or** unlock — as indicated.

Periodically, the valve should be operated to ensure free movement; normally the valve should be kept in the unlock position.

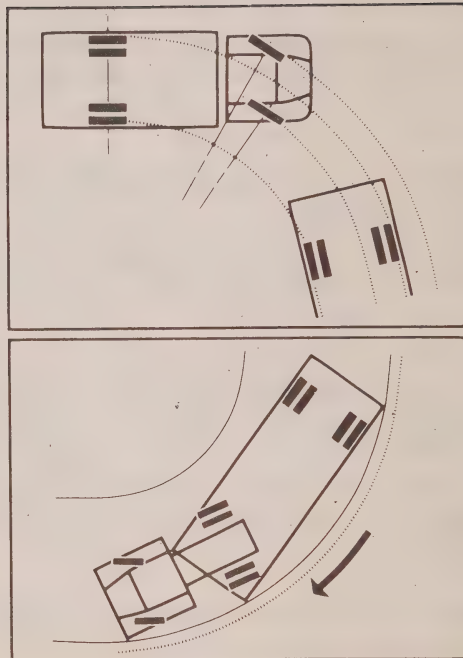
Lock position should be used only when the vehicle approaches adverse traction conditions where one or both wheels of an axle may slip. This locks the differential and causes it to act as a "through drive", transmitting power equally to both axles. Avoid unnecessary use of differential lock since it will result in tire wear and axle strain.

Caution: Differential lock should not be activated when wheels are actually spinning.

STEERING (FORWARD) AND OFF TRACK

The rear wheels of the vehicle do not pivot and therefore will not follow the same path as the front wheels. The greater the distance (wheel base) between the front wheels and the rear wheels of the vehicle, the greater the amount of "off-track". The off-track path has a shorter radius than the path of the front wheels.

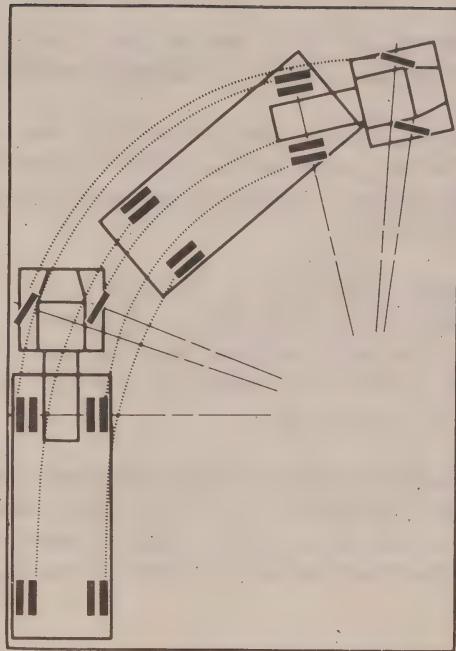
On the open highway, you must lead your turning arc of the front wheels in accordance to the sharpness of the curve and the amount of off-track of your vehicle. A curve to the right requires keeping the front wheels close to the centre line to prevent dropping the rear wheels off the pavement. A curve to the left requires keeping the front wheels close to the right edge of the pavement to prevent the rear wheels from crossing into the other traffic lane.



The combination vehicle, such as a semi-trailer unit, has an off-track of the rear wheels of the tractor unit, and a greater off-track again of the rear wheels of a semi.

The combination unit of a truck-tractor and semi-trailer, has different turning characteristics. These units have a turning radius and off-track pattern within each unit, but the amount of off-track is dependent upon the length of the combination and the wheel base of the units.

Whenever possible, turns must be made from the proper lanes. When it becomes necessary for the driver to direct the vehicle over lane lines or centre lines to negotiate sharp turns, it is the driver's responsibility to be sure that such a movement can be made safely, without interfering with other traffic.



STEERING WHILE REVERSING

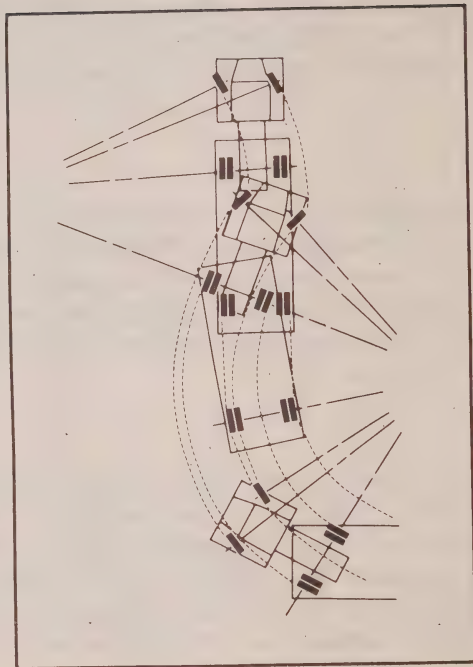
The control of a single unit vehicle is maintained in the same manner as that of a passenger vehicle.

In backing a tractor with a semi-trailer, the front wheels of the tractor must be turned in the direction opposite to that in which it is desired to move the rear of the trailer.

Depending on the amount of change in direction, the tractor must follow in a track related to the track of the trailer, otherwise it will jack-knife. The tracking pattern for a normal right angle turn would be an "S" shaped curve.

When backing a vehicle, both rear view mirrors should be used. A vehicle should be backed slowly because, even with two mirrors, vision is limited. There always is a "blind spot" to the rear which a mirror cannot reflect.

When no observer is present to assist, the driver should leave the vehicle and check the path it will take.

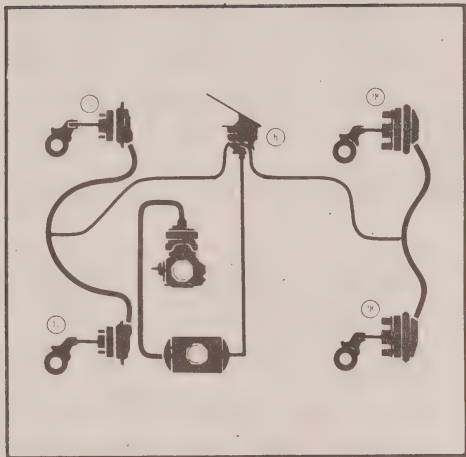


BRAKE INSPECTION

While drivers are not expected to be able to service a disabled braking system, they should be knowledgeable enough to pinpoint the trouble. The following inspection routines should always be carried out in conjunction with the pre-trip circle check.

1. **HYDRAULIC BRAKES** (without power assist):
 - a. apply brakes moderately and hold;
 - b. if pedal shows a steady drop, vehicle should be taken out of service and system inspected.
2. **HYDRAULIC BRAKES** (with power assist):
 - a. with engine stopped, pump brake pedal several times to eliminate power assist;
 - b. apply brakes moderately and hold;
 - c. start engine (pedal should drop slightly) and stop;
 - d. if pedal continues to drop or does not drop (no power assist) stop engine. Vehicle should be taken out of service and system inspected.

HOW THE BASIC AIR BRAKE SYSTEM WORKS



Air is pumped by the compressor (1) to the reservoir (3).

Air is available from the reservoir to the bottom of the foot valve (6).

The driver pushes down the foot valve and air under pressure flows to the front and rear brake chambers. (17)(18)

The brake chamber push rods move the slack adjusters; the slack adjusters rotate the brake cams, forcing the brake shoes

against the drums, causing friction to stop the vehicle. The driver releases the foot valve, and the air in the brake chambers is allowed to exhaust through the foot valve, releasing the brakes.

This basic system does not contain valves which will ensure smooth and efficient operation! Nor would its components compensate for loss of air or errors in the operator's judgment!

3. AIR BRAKES

- a. start engine (fast idle);
- b. if pressure is below 414 kPa (60 P.S.I. to 80 P.S.I.) low air pressure warning device should operate on some types of vehicles, i.e. tractors or highway coach;
- c. pressure should build up from 345 kPa (50 P.S.I.) to 621 kPa (90 P.S.I.) in 3 to 5 minutes depending on the number of braking axles in the system;

- d. warning should cease between 345 kPa (50 P.S.I.) and 414 kPa (60 P.S.I.);
- e. build maximum pressure. Governor should cut out at 690 kPa (100 P.S.I.) to 897 kPa (130 P.S.I.);
- f. fan brakes to drop pressure. Governor should cut in at about 552 kPa (80 P.S.I.);
- g. build maximum pressure and stop engine;
- h. apply full foot valve and hold. Air pressure will drop on application of the brakes. You should be aware that the amount of this pressure drop increases gradually as the brakes wear. Therefore, as a driver you should be familiar with the normal pressure drop which occurs when the brakes are fully applied and properly adjusted. You should also know the acceptable additional amount of pressure drop before adjustment is required.
- i. continue to hold full application, drop should not exceed 21kPa/min. (3 P.S.I.) on a straight truck, 28 kPa/min. (4 P.S.I.) on a tractor trailer and 41 kPa/min. (6 P.S.I.) with a pup trailer in the combination;
- j. disconnect emergency and service lines to the trailer and the trailer brakes should apply;
- k. apply full foot valve. . . there should be no air loss through the disconnected service line;
- l. reconnect trailer lines and start engine;
- m. exhaust trailer emergency valve to test trailer emergency application (spring brakes);
- n. recharge system;
- o. move vehicle ahead slowly, test tractor and trailer brakes together and trailer brakes separately (if hand control valve fitted);
- p. air tank should be drained of moisture at least once a day.

USE OF BRAKES

1. Brakes should be applied with steady pressure at the beginning of a stop, then eased off as the vehicle slows. Just before the vehicle comes to a complete stop, brakes should be released to avoid jerk and rebound, then applied again to hold vehicle while stopped.
2. Brakes should not be fanned (alternately applied and released) except on slippery pavement where this type of braking gives better control, reduces danger of skidding and gives a shorter stop. Fanning reduces air pressure and serves no useful purpose on dry pavement and fanning on a long downhill grade may reduce air pressure below the minimum pressure needed for proper brake operation.
3. Great care must be taken to avoid excessive use of brakes on long downgrades, as overheated brakes are dangerously inefficient. Drivers should use engine compression as the principal means of controlling speed on long grades.

Drivers should use the same gear in descending a long grade as they would in climbing it. Gear selection should be made before descending a grade to minimize the chance of missing a shift.

4. If the low air pressure warning device operates at anytime, drivers must stop immediately in the safest available place and correct the loss of air pressure before proceeding.
5. If brakes should fail on a level road, drivers should downshift and use engine compression to slow the vehicle. If a shorter stopping distance is necessary, they should use the tractor and trailer emergency brakes, if fitted, to stop. The vehicle should not be driven until repairs have been made.
6. In a combination of vehicles such as a truck-tractor and semi-trailer, trailer brakes are applied with the truck brakes by use of the foot control valve. This is known as balanced braking.

The application pressure of the trailer brakes is equal to the application pressure of the truck-tractor brakes. Trailer brakes may be applied independently by use of the trailer hand valve. The amount of pressure on the trailer brakes, during a foot valve application, may be increased by using a higher application of the hand valve.

7. When braking a combination of vehicles on wet or slippery surfaces, or on a curve, care must be exercised. Overbraking in these circumstances can result in skidding or jack-knifing. If the tractor is jack-knifing, i.e. tractor rear wheels sliding sideways, drivers should apply the trailer brakes only. If the trailer is jack-knifing, i.e. the trailer rear wheels sliding sideways, drivers should release all brakes and apply power.
8. Emergency (spring brakes) are installed on newer equipment. They apply automatically when the air pressure in the system drops below

a pre-determined level. Usually between 242-280kPa (35-40 P.S.I.) dependent on valve setting.

PARKING

To ensure that a unit will stay in position when parked, the following precautions must be observed to prevent a runaway vehicle.

1. Set parking brake or spring brake in power unit.
2. Block the unit.
3. Under no circumstances should a driver use the trailer hand valve if fitted or the tractor protection valve to hold a parked unit.

DRIVER CONDUCT

Today's truck and bus drivers are among the highway's most visible citizens, and the motoring public tends to criticize some of their driving practices. So, it's up to them to influence the public's opinions. Be a defensive driver, anticipate what other drivers might do and compensate.

1. **Obstructing Traffic:** Reduced speed on hills is often unavoidable, but good drivers can reduce the delay to faster vehicles by being aware of the following traffic and pulling off the roadway when safe to do so, allowing faster traffic to pass. Under no circumstances should drivers use left-turn signals to indicate to following motorists it's safe to pass. Such use is unlawful and tends only to confuse drivers in following traffic because the basic intent of such signals is to indicate a left turn or lane change.
2. **Improper Passing:** Some truck and bus drivers switch on their turn signals and immediately pull out into traffic when the traffic stream is too close and dense. Another complaint is the practice of pulling out to pass another large vehicle on a multiple lane highway when the difference in speed is so small that the manoeuvre obstructs following traffic for an unreasonable period of time. Such action should be avoided.
3. **Bluffing:** Drivers who use the large size of their vehicles to force their way through traffic may create serious hazards.
4. **Following:** When a group of trucks pull onto a highway after a stop, drivers should do so at intervals which will permit proper spacing. Commercial motor vehicles must maintain a minimum distance of at least 60 m (200 feet) between them and other vehicles when on a highway at a speed exceeding 60 km/h (40 m.p.h.) except when overtaking and passing another motor vehicle.

SPECIAL RULES

Railroad Crossings

Buses and licensed public vehicles must observe special rules at such crossings. Except when the crossing is controlled by gates or railway crossing signal lights or flagman, buses and licensed public vehicles must come to a full stop not less than 5 m (15 feet) from the nearest rail, open door and listen for approaching trains and select a gear suitable for crossing the tracks and shall not change that gear while crossing.

Clearances

Drivers of larger vehicles must know their vehicle's height and width and watch for and obey clearance signs on bridges and underpasses. They must also remember that road repairs, rough roads, ice, floods or empty equipment may cause difficulty where clearance is otherwise normally adequate.

Drivers must follow instructions designated by signs posted where dangerous conditions exist and obey regulations which ban trucks on certain highways, or at certain times or days.

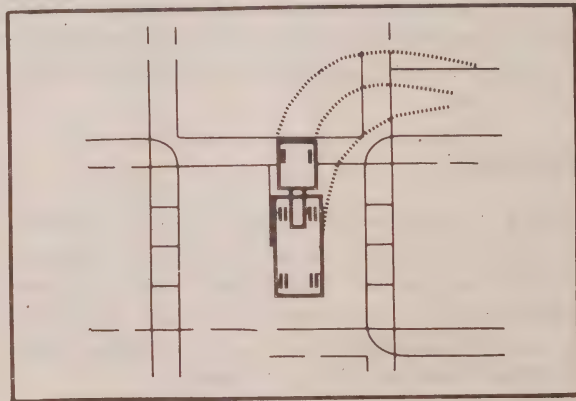
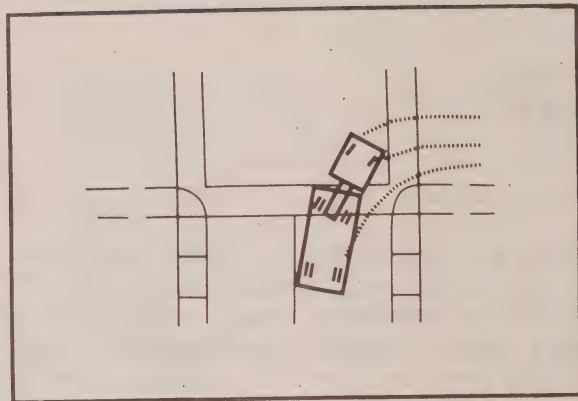
Turns

Turning a large vehicle requires more care and knowledge than turning a passenger car. Besides observing the general turn rules outlined in the Driver's Handbook, operators of large vehicles must keep other factors to bear in mind. For example, during a given turn of the steering wheel, the rear wheels follow a shorter path than those up front. Allow for this on all turns so that the vehicle doesn't strike another vehicle or stationary object.

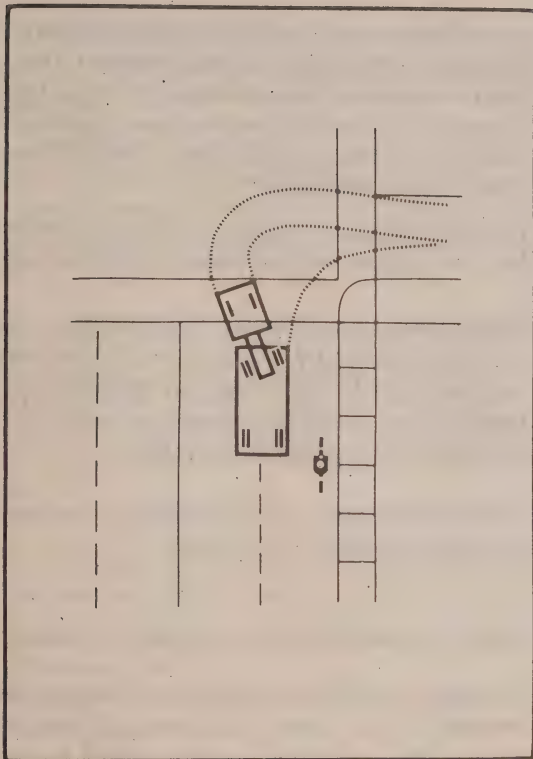
RIGHT ANGLE TURNS

Right angle turns at intersections with vehicles which have an appreciable amount of off track, require the driver to lead the turning arc in accordance to the amount of "off" track. Running the rear wheels of the unit over curbs and sidewalks not only results in tire damage, but is hazardous to pedestrians. Power poles, sign posts or lamp standards mounted close to the curbing at intersections are fixed object hazards.

If streets are narrow, it will be necessary for drivers to proceed well into the intersection before commencing a turn. It may be necessary to travel over the centre line of the street entered or into the second traffic lane. When necessary because of the limited width of the street, drivers must use extreme caution and ensure the movement can be made safely.



RIGHT ANGLE TURNS (continued)



When it becomes necessary to “block” off another traffic lane, ensure that smaller vehicles, motorcycles, or cyclists are not attempting to move on your right. The critical point is reached when the tractor is at the sharpest point of the turn in relation to the trailer, because vision via the right rear view mirror is limited.

EMERGENCY WARNING DEVICES

Every commercial motor vehicle, when on a highway outside a city, town or village when lighted lamps are required to be displayed on vehicles, shall be equipped with a sufficient number of:

- (a) flares, lamps, or lanterns which have been approved by the Ministry, capable of continuously producing two warning lights, each visible from a distance of at least 150 m (500 feet) for at least eight hours; or,
- (b) portable reflectors approved by the Ministry.

Whenever any commercial motor vehicle or trailer is disabled during the period when lighted lamps are required to be displayed on vehicles and the vehicle cannot immediately be removed from the travelled portion of a highway outside a city, town or village, the driver or other person in charge of the vehicle shall light such flares, lamps or lanterns and place them or portable reflectors approved by the Ministry

on the highway until such time as lighted lamps are not required or the vehicle has been removed. One must be at a distance of approximately 30 m (100 feet) in advance of the vehicle and one approximately 30 m (100 feet) to the rear and visible from a distance of at least 150 m (500 feet).

Even during daylight hours, if visibility is limited by fog, rain or snow, warning devices should be used.

Hills, Curves, etc: Whenever the view of a stopped vehicle is blocked by a hill, curve or other obstruction within 150 m (500 feet), an additional warning signal in that direction should be placed to give ample warning to other highway users.

Caution should be used in locating flares where fuel or flammable material has leaked.

SPECIAL INFORMATION FOR BUS DRIVERS

The safe and efficient transportation of people requires a high degree of driving skill and a bus driver's most important concern should be for the

safety of their passengers at all times. They should be aware of traffic around the bus to prevent panic stops or sudden swerves.

When approaching a loading zone, vehicle speed should be such that a slow, smooth stop can be made. Doors should remain closed until the bus comes to a full stop, as close to the curb or loading zone as possible.

Before starting, drivers must be certain doors are closed properly. Acceleration should be smooth, picking up speed gradually. At no time, should passengers be allowed to occupy a position that would interfere with a driver's vision to the side and rear.

Pre-trip bus inspection includes, in addition to that for a commercial vehicle, inspection of:

- a. Emergency exits;
- b. Emergency equipment, (axe, fire-extinguisher, first aid kit, flares, etc.);

- c. Interior lights;
- d. Signs.

The following are excerpts from the Public Vehicles Act:

No Driver of a public vehicle carrying passengers shall:

- a. Drink intoxicating liquor while on duty;
- b. Smoke while driving;
- c. Refuse to carry passengers without good reason;
- d. Tow a trailer with a public vehicle.

And every public vehicle shall:

- a. Have at least two doors or exits with clear access;
- b. Be equipped with a speedometer;
- c. Be equipped with a fire extinguisher and an axe;
- d. Stop not less than 5 m (15 feet) from the nearest rail at an unprotected railway crossing;
- e. Be equipped with a sufficient number of emergency flares or lamps.

PRECAUTIONS

Laws governing the operation of a motor vehicle must be scrupulously observed and additional effort expended to provide that EVERY good driving practice and safety rule is followed.

1. Backing a bus should be undertaken with the utmost care and caution. Drivers should use the rear view mirror, turn and look back and have someone give directions. Back slowly and cautiously and watch traffic conditions around the vehicle at all times.
2. Adverse weather conditions require adjustments to driving procedures. Drivers should exercise an exceptional degree of care and prudence during such conditions.
3. Drivers must adjust the speed to meet road, weather and traffic conditions.
4. Drivers should not leave their bus without first stopping the engine and removing the ignition key, setting the brakes, and putting the transmission in its lowest gear.
5. All doors should be tightly closed whenever the bus is in motion.
6. Buses should be heated or cooled and ventilated properly.
7. At no time should a bus be loaded beyond its licensed capacity.
8. Drivers should avoid situations which require quick stops.
9. Drivers must not permit any unauthorized person to occupy the driver's seat, operate the bus or any of its controls.

BREAKDOWN PROCEDURE

If a bus stalls or breaks down on the highway, drivers should quickly and calmly take the necessary actions to safeguard the passengers and other motorists.

1. The bus should be brought to a stop as far off the roadway as possible. Passengers may remain in the bus.
2. If the bus cannot be removed from the highway, passengers should be evacuated to a place of safety.
3. Flares, lamps, lanterns or portable reflectors should be set out at a distance of approximately 30 m (100 feet) in advance of the vehicle and at a distance of approximately 30 m (100 feet) to the rear of the vehicle and visible for a distance of at least 150 m (500 feet).
4. Drivers unable to determine or correct the trouble should remain with the vehicle and request a responsible person to seek aid.

SCHOOL PURPOSES BUS INFORMATION

Drivers of school purposes buses require a class B or E driver's licence. Requirements and other information concerning the operation of school buses and school purposes buses may be found in the School Bus Manual which is available on request from any driver examination office.

FIRE PRECAUTIONS

Commercial vehicle drivers should know how to take preventive measures against fire and have a basic knowledge of fire fighting techniques. It's also essential to know what type of extinguisher or retardant to use on different types of fires.

Class A fires include burning wood, paper, textiles, tires, etc.

Class B fires include grease, oil, gasoline, solvents, paints, etc.

Class C fires are those occurring in live electrical equipment.

Class D fires include burning metals such as magnesium, sodium potassium, etc. Only special compounds should be used to extinguish fires on these materials. A B C or B C or class D compound extinguishers can be used.

Some of the common causes for commercial vehicle fires are:

1. Running with a soft tire. Tires should be checked at least every 160 km (100 miles) for pressure;
2. Overheated brakes, either from misuse or maladjustment. Check hub temperatures every time tires are checked;
3. Leaking fuel system, carburetor, pump, filter, tanks or lines;

4. Unequal distribution of load causing trailer to lean and rub on tires;
5. Careless smoking habits. Lighted cigarettes and cigars should always be butted in ash-trays, never thrown out windows. Never smoke while loading or unloading;
6. Blocked air vents in a heated van can sometimes cause an explosion;
7. Carelessly placed flares, lamps or fuzes used in an emergency;
8. Short circuits in the electrical system.

There are various other reasons for fires, such as faulty exhaust systems with leaks or those which have been installed too close to fuel lines or wooden body parts. Occasionally, spontaneous combustion may occur in a van or trailer. Drivers must always know the nature of their cargoes, so necessary fire control precautions can be taken.

When a fire occurs, some or all of the following actions can be taken:

1. Stop the vehicle in a safe position away from buildings and other vehicles;
2. If it is a combination unit, uncouple the units;
3. If fire occurs in a town or nearby, contact the fire department. Tell them what type of material is burning;
4. Determine what type of fire it is and take all possible steps to extinguish it;
5. If fire is thought to be due to a short-circuit, remove battery cables;
6. If the cargo is of an explosive nature, stop traffic and warn spectators to stay back.

TRUCK & BUS SAMPLE QUESTIONS

1. When travelling at less than the normal traffic speed, what lane should you use?
2. What colour of light identifies a snow removal vehicle?
3. Except when passing, how many metres (feet) must be maintained between commercial vehicles or buses travelling in the same direction on a highway outside a city, town or village?
4. What must the driver of a truck or bus do before entering a highway from a private road or driveway?
5. When a bus or truck becomes disabled on a roadway during the period when lights are required, at what distance must flares or reflectors be placed to the front and rear of the vehicle?
6. What must bus drivers do on approaching a level railway crossing, unprotected by gates or railway crossing signal lights, or flagman?

7. Semi-trailers, other than those transporting vehicles, are limited to a length of?
8. What is the most important concern to a bus driver?
9. When uncoupling a semi-trailer unit, what is the next step after lowering the landing gear?
10. What should tractor-trailer drivers do while rounding a right curve on a highway?
11. What is the maximum length of any combination of vehicles?
12. When should drivers carry out the "Circle Check"?
13. When backing to couple a semi-trailer, the fifth wheel opening must be in direct line with?

14. When a load projects 1.5 m (five feet) or more over the rear of a vehicle, what should it be marked with?
15. Buses, other than articulated, are limited in length to?
16. When entering a freeway, you should signal, then?
17. What does the gross weight of a commercial vehicle mean?
18. You should, under all conditions, drive at a speed which will allow you to?
19. What's the most important factor bus drivers must base their safe driving speed on?
20. All vehicles, including load, are limited to a height of?

FUEL SAVING TIPS

Before the trip:

- Inflate tires to the maximum air pressure recommended by the tire manufacturer.
- Carefully fill fuel tanks, accepting the automatic shut-off and tightening the cap. Allow room for fuel expansion in hot weather.
- Check the engine oil level and avoid over-filling.

Starting up:

- Reduce cranking time. A well-tuned engine should start within 30 seconds. Wait two minutes before re-cranking. . . if it doesn't start.
- Avoid pumping the accelerator (gasoline engines).
- Use the choke correctly (gasoline engines).
- Use the cold weather starting aids correctly. Don't use them to excess.
- Reduce "warm-up" idling time after starting.

Moving out:

- Do pre-trip inspection before starting a gasoline engine and after starting a diesel engine.
- Move out soon and slowly.
- Drive at low speeds initially. Cold engines have high internal friction until they warm up. High speed driving on a cold engine causes heavy wear and excessive fuel use.

- Increase speed only when the engine is warm.

During the trip:

- Low engine RPM saves fuel, so use progressive shifting.
- Manage your road speed. At highway speeds the faster you go, the more fuel you will use with any type truck on any route.
- Whenever possible run in the 70-90 km/h fuel-efficient range. Faster or slower than that, consumption will suffer.
- Match gear to speed. You should always be in a gear where your RPM is as low as possible, at least 200-300 RPM below the governed maximum. You cannot get good fuel consumption unless you combine efficient engine speed with efficient road speed.
- Minimize idling by shutting down the engine whenever possible. Except in very cold weather, it's always best. Fuel for comfort is a poor investment.
- Maintain a steady cruise speed, the lowest steady speed which will permit on-time arrival at your destination.
- When approaching an upgrade, open the throttle smoothly and shift down only when engine speed makes it necessary.

Operating in traffic:

- Anticipate how traffic conditions are changing and what other drivers will do. By observation ahead, behind and to the sides, maintain an efficient speed or make smaller speed adjustments.
- Select lanes with the smoothest traffic flow.
- Select lanes for efficient speed.
- Maintain a space buffer between your truck and vehicles ahead. This will minimize speed changes and use of brakes. Letting your buffer shrink and expand will make your driving smoother and therefore more fuel efficient. The buffer will also enable you to make safe lane changes without slowing down.
- A good guide for your space buffer is four to six seconds following distance under normal operating conditions.

Summary:

If you learn and practise the following techniques, you'll be well on the way to obtaining good fuel consumption:

- Use good starting procedures;
- Get going as soon as you can;
- Control your idling;
- Be an RPM miser;
- Use progressive shifting;
- Maintain efficient engine speed;
- Manage your road speed;
- Operate efficiently in traffic.



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